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A CRITIQUE OF THE TREATMENT OF LARYNGEAL CANCER.*

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The principles governing the treatment of cancer call for, first, the complete removal or destruction of the primary growth; and, secondly, the removal or destruction of all possible lymphatic involvement. In connection with intrinsic cancer of the larynx, only the first of these requisites is applicable. Wide removal of the primary growth is sufficient to cure. The lymphatic fields, unless there are palpable nodes, need not be regarded. The case is very different in regard to borderline and external growths; in these, the lymphatic drainage area must most seriously be considered.

When, in the course of a chronic laryngitis, any tumor forms on the cord, it should be at once removed and carefully examined. It may be only a heaping up of normal epithelial cells; on the other hand, early malignant change may be found. Should such be the case, the patient must be kept under observation and any recurrence will call for removal of the whole cord.

Treatment of Precancerous Lesions: Leukoplakia, pachydermia laryngis and keratosis, since they may undergo malignant degeneration, require surgical removal. Moreover, one

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can never say, from the clinical appearance, that such growths have not already undergone malignant degeneration; only histological examination will determine this. Thorough removal is called for, even though it may be necessary to affect this through a laryngofissure. These growths, however, if small can safely be removed by the use of the direct laryngeal speculum and punch forceps. Somewhat larger growths can be removed by means of suspension apparatus for exposure, then the more careful dissection which this allows. Most surgeons follow removal of the growth by coagulating the base by diathermy.

Two methods of treatment are at the disposal of the surgeon, namely, radiotherapy by means of radium, or X-ray and surgery.

Radiotherapy: The use of radiotherapy in cancer of the larynx is based on the power of the radium and X-rays to destroy the living cells. Cells near mitosis and tissues in which the cells divide frequently are believed to be especially sensitive to irradiation. Such are most cancer cells. They are more readily destroyed than normal cells. If their resistance to radiotherapy approaches or equals that of the surrounding normal cells, the cancer may not be destroyed without destroying the surrounding cells; consequently, no radioresistant cancer situated in a vital area is justifiably treated by radiotherapy.

The reaction to radiotherapy is likely to be rather severe. During its height and ensuing days, hospitalization may be called for. There may be dehydration, loss of appetite and danger of aspiration pneumonia. If the dehydration is severe, fluid by protoclysis and hypodemoclysis may be indicated. At times intralaryngeal reaction may be such that a tracheotomy may be called for. If the case is such that a probable tracheotomy is indicated, it should be done before the radiotherapy has been instituted.

Radiosensitivity and radiocurability are not always synonymous. A superficial cancer, even though not very radiosensitive histologically, can be cured because a sufficient dose can be delivered without harming the surrounding tissue. On the other hand, a radiosensitive tumor, if deeply infiltrating, may not be curable by irradiation because of the impossibility of delivering a lethal dose to the deep-lying cancer cells without

so harming the surrounding tissue as to leave the organ an easy mark for infection and necrosis.

The curability of a cancer also depends on the possibility of reaching all lymphatic drainage areas. Cord tumors invade the lymphatics only slowly. Extrinsic carcinomas if at all large are liable to have widespread metastases in the glands of the neck and call for large fields of irradiation for their cure.

Careful preparation is required for X-ray therapy of a laryngeal cancer, as careful, indeed, as for a laryngectomy. The mouth must be cleared of sepsis, the circulatory organs and kidneys examined and strengthened. Any faults in the blood chemistry must be corrected. Finally, as already mentioned, if there appears to be danger of asphyxiation through local reaction a preliminary tracheotomy should be done.

Irradiation by radium or X-ray has hitherto been spoken of by laryngologists only to be condemned. The line of reasoning was as follows: Since 96 per cent of laryngeal carcinomas are squamous-cell, rather well differentiated, they are not, as a rule, radiosensitive. In incipient or doubtful cases, the reaction to radium treatment may obscure the clinical picture, making it impossible to estimate the extent of the disease or to complete the diagnosis. To this it may be said that no treatment should be begun till the diagnosis is complete. Radium or X-ray may produce marked recession of the disease, even to seeming disappearance.

On its reappearance, the same reaction may again be brought about, but to a less degree, and so on, until the growth is completely radioresistant. Then surgery cannot be used as the wound will not heal.

On the other hand, it must be remembered that the treatment of carcinomas of the larynx by radiation is yet in only the trial stage. The results of surgical treatment in the early stage of its development were equally as bad as those of radiotherapy at present. In recent years, rapid improvement in the technique of X-ray therapy has been made, so that it would appear that many of the difficulties have been overcome. When radiotherapy is successful, the result is an intact larynx without deformity. No surgery can produce such a result. In view of such perfection in results, the claims of radiotherapy can-

not be lightly dismissed and surgeons should co-operate where possible in asertaining the indications and limitations.

Radiotherapy has an additional advantage in borderline and extrinsic cancers in which the lymphatics are probably or surely involved. The fields of radiation may be so arranged that not only is the primary growth treated but at the same time the lymphatic drainage is covered. The irradiation may be applied by means of radium within or without the larynx, or by means of X-ray therapy from without.

Internal Application: Radium has been placed within the larynx with intubation tubes, catheters and other applicators. Radon seeds have been implanted into the tumor following thyrotomy. The effectiveness of these procedures is limited to the tissue close to the radium. The proximity of the laryngeal cartilage to the radium increases the danger of chondronecrosis. Records are available on a small number of cases successfully treated by these methods.

External Application: Transcutaneous therapy by radium packs have the advantage that the deepest parts of the growths are nearest the source of irradiation, and glandular metastases and large areas of tissue suspected of microscopic invasion may be included in the field of irradiation. The action of radium packs is similar to X-ray therapy, but on account of the small supply of radium, radium pack treatment is limited to few institutions, and even then to relatively few patients. Window resection and the application of radium needles according to the method of Ledoux and Harmer has produced some favorable results.

This operation is performed as follows: The medium incision is made over the front of the larynx and deepened to the thyroid cartilage; the perichondrium and overlying soft parts are then stripped back from the side of the larynx affected. As much of the thyroid wing is then removed as is necessary to expose the base of the growth and considerable portion of the surrounding tissue. Radium needles are then inserted into this gap, their number and strength depending on the size of the growth to be attacked. The tissue is then closed over them, the strings attached to them being left protruding through the external wound. At the end of the proper time, the needles are removed by pulling on the strings. The wound

is allowed to heal without suturing. There are, as a rule, no severe sequelae to this procedure. Exceedingly favorable results in some cases have been reported.

X-ray: X-ray therapy is readily accessible and when correctly given is just as successful as applications of radium. Technique of X-ray therapy is being constantly improved and it is possible that in the future it may replace surgery. Of 11 laryngeal cancers treated at the Presbyterian Hospital, New York, during 1931-32, four at the present time show no evidence of disease. The favorable cases appear to have been the ones where the growths were superficial and had a tendency to sprout into the larynx, because there were no vital tissues to be destroyed. These are also the cases most favorable for surgery. No cases where the growth infiltrated were arrested by radiotherapy alone. The proper procedure appears to be, to first take a biopsy. If the growth is histologically radiosensitive and is not infiltrating, X-ray therapy may justifiably be attempted. If the growth is infiltrating, especially if cartilage is involved, surgery will be the best treatment, followed perhaps by radiation. Since the infiltrating cells can be killed only by killing host cells, chondronecrosis will result if a laryngectomy is not first done. Lymphatic involvement can perhaps be controlled by radiation after the laryngectomy, though block dissection of the neck is safer. Preoperative radiation may be even better.

The decision for the choice between radiotherapy and surgical treatment of carcinoma of the larynx will at times be difficult. The medical profession and even the laity are so much more on the lookout for early cancer of the larynx that extremely early cases are now seen fairly frequently, whereas in former years it was extremely rare to see such cases. The early superficial cases undoubtedly have been cured by radiotherapy and, considering the perfection of the result, one is strongly tempted to adopt this procedure. It must be remembered, however, that we do not yet know how durable the cure of these cases by X-ray will prove to be; also, if the recurrence does come about, there is no resource left, either in X-ray or surgery. It seems, then, best for the present to turn resolutely to some form of surgical removal as the best procedure.

Surgical Treatment: Intralaryngeal removal: Beyond any doubt, it is possible to remove early carcinoma of the larynx

by intralaryngeal removal during the taking of a biopsy. It must be remembered that the early carcinoma involves only the epithelium of the mucous membrane and extends first along the cord without infiltration. In two instances, the present author has had the experience of removing a small growth for biopsy. In one of these instances, although the histological examination strongly indicated a carcinoma, nothing further was done and the cord healed smoothly. There was never any recurrence of the growth. In the other case, following the removal of a growth which appeared to be carcinoma on histological examination, a thyrotomy was done and the cord removed. Careful examination of the cord showed no carcinoma.

Others have reported successful results by these methods; Lynch reported nine cases, of which three had recurrence. The other cases, however, had not sufficient duration after operation to be called cures. It can be said, then, that intralaryngeal removal of carcinoma is possible, but it is not to be recommended. The method submits the patient to too great a risk. The exposure is not such that the extent of the growth can be surely determined and a partial removal wastes valuable time and may stimulate the growth.

The surgeon's choice must be between excision through a laryngofissure or a total laryngectomy. The term laryngofissure refers merely to the incision into the larynx. The more proper term would be partial laryngectomy by the laryngofissure route. Laryngofissure should be the method of choice in all early intrinsic laryngeal cancers. By an early intrinsic cancer is meant one which is limited to the central area of one cord and has not yet affected the mobility of the cord. Decrease of mobility of the cord signifies that there has been penetration of the cord itself and the muscles controlling its movement. Fixation of the cord means that the arytenoid region has been reached by the growth, and such a condition signifies advanced cancer. Similarly, when the anterior commissure has been reached by the growth. and especially when the anterior end of the opposite cord has been involved, the cancer is advanced. The significance of limitation of mobility is illustrated by Sir St. Clair Thomson. In 37 cases in which the cord was mobile, 84 per cent three-year cures were obtained; in 20 cases in which the movement of the cord was

impaired, 75 per cent three-year cures were obtained; in nine cases the cord was fixed and only 44 per cent three-year cures were obtained.

When the aryepiglottic fold, epiglottis or subcordial regions have been invaded, the case is no longer suitable for an attack by the laryngo-fissure incision. There are two reasons for this: First, there is great probability that the thyroid membrane or the cricothyroid membrane has been penetrated and the subcutaneous tissue invaded; secondly, the region of lymphatics has been reached and lymphatic invasion may have occurred. When lymphatic areas have been reached, a total laryngectomy should be done, followed by block dissection of the lymphatics of the neck or by radiotherapy.

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SARCOMA OF THE NASOPHARYNX, WITH REPORT OF CASE.*

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It is not my purpose in this short paper to discuss the cause of malignancy, the histological types of the major groups, or the vast amount of experimental work which has been done in furtherance of our general knowledge of malignant disease.

I shall, however, bring to your attention some points of practical interest in connection with the diagnosis of malignant disease originating in the nasopharynx and report on one case found in this area.

First to be noted is the infrequency of the condition. This point is really of major importance because of the possibility of not making a postnasal examination in the absence of definite indications for so doing. Various observers have emphasized this point because, in the earlier stages of malignant development, there may be no symptoms referable to this region, and the examining surgeon may be satisfied with findings which do suggest pathology involving the sinuses, septum, tonsils, or cervical glands. This should not occur of course, but doubtless it has occurred at times and thus it becomes possible that postnasal malignant tumors have been permitted to develop to the stage at which, when finally discovered, they are beyond hope of more than temporary relief from any form of treatment.

From the literature covering the past 30 or 40 years one gains the impression that a greater number of nasopharyngeal growths have been found in more recent years than formerly. This may be due in part to the general increase in malignant disease, but doubtless also to the more thorough methods now employed in diagnosis. A few figures will serve to illustrate the matter of frequency.

Quoting from Lack's[1] figures covering an earlier period, he stated that in 28,000 out-patients, Herzfeld found but one

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case of malignant disease involving the nose. Finder saw five cases in 40,000 patients, and among 848 cases of sarcoma, the nose was the site of the disease in but 15 cases. Gurlt, in 10,000 cases of malignant disease, found the nose affected in 18; in four by carcinoma and in 14 by sarcoma.

More recently, Needles,[2] in a report on 35 cases of malignancy in the nasopharynx, found but two of these to be sarcoma. Salinger and Pearlman,[3] in 24 cases of malignant tumors of the epipharynx, definitely identified but one as sarcoma. New,[4] in a series of 246 patients with highly malignant tumors of the nasopharynx and pharynx, observed in a period of 14 years at the Mayo Clinic, found 55 to be lymphosarcoma. Many more references might be cited but this is sufficient to demonstrate that the nasopharynx is seldom the site of malignancy, and still less frequently is the tumor found to be sarcomatous.

The question naturally arises as to whether or not there may be any particular group of symptoms which suggest tumor in the nasopharynx. New published a paper in the *Journal of the American Medical Association*, of July 1, 1922, entitled, "Syndrome of Malignant Tumors of the Nasopharynx." In this paper he expresses the belief that malignant tumors of the nasopharynx are much more common than is generally believed, and that because of the frequent lack of nasopharyngeal symptoms, many such patients are treated medically and surgically without discovery of the tumor. He, therefore, points out that when there are symptoms referable to the eye, ear, nose, pharynx and cervical glands, any one or all of these regions, the nasopharynx should be examined for a possible tumor. Needles, in the paper above mentioned, cites the case of a woman who underwent six operations, including extraction of a molar tooth, injection of the maxillary nerve and radical antrum operation, all within the year previous to the discovery of a mass in the nasopharnyx which proved to be a carcinoma. Shapiro,[5] in discussing this same point, states that "all patients complaining of pain in the head, face, neck and showing nerve lesions should have nose and throat examined and the glands of the neck carefully investigated." He also points out the close anatomical relationship of the IInd, IIIrd and IVth, second and third divisions of the Vth, the VIth nerves, the Gasserian ganglion, the IXth, Xth and XIth nerves and, consequently, the possi-

bility of one or more of these nerves becoming involved from encroachment of a growing tumor in this area. He especially emphasizes the importance of remembering that whichever other nerves are affected, the IXth, Xth and XIth are consistently injured together by lesions in the region of the jugular foramen. He credits Vernet with formulating a triad of symptoms indicative of complete loss of function of these nerves: *1.* Nasal regurgitation of fluids, due to paralysis of the palate; *2.* dysphagia of solids, due to paralysis of the pharynx; *3.* hoarseness, due to paralysis of the larynx.

Needles puts it this way: When, in addition to auditory symptoms — tinnitus, deafness, pain or stuffiness in the region of the ear — "one is confronted by cervical enlargement *and* involvement of the cranial nerves at the base of the brain, a full-fledged syndrome of nasopharyngeal malignancy is present and the necessity for ruling out a nasopharyngeal tumor should be nothing short of compelling."

While it is very evident that nerves will manifest symptoms or irritation or loss of function from encroachment of a growing tumor, it can also be readily understood that as long as this encroachment does not occur tnere may be but little to suggest the presence of a tumor in the nasopharynx.

Such was the condition of affairs in the case I now present.

REPORT OF CASE.

M. D., an Italian boy, age 15 years, was referred to the out-patient Nose and Throat Service of Jefferson Hospital for examination and treatment of condition found. This patient was first seen on Aug. 16, 1932. His chief and only complaint was nasal obstruction, which had been first noted in connection with a "head cold" from which he had suffered three or four weeks previously. While the "cold" had cleared up, the nasal obstruction had continued and at times he had blown considerable quantities of thick, mucopurulent material from both sides of the nose. Occasionally blood appeared in this exudate. He had no pain, no eye or ear symptoms. His speech was normal. He appeared to be in good health and was attending school regularly.

Routine examination of the nares showed them to be open and clean. Tonsils and adenoids had been removed five years previously. He had pneumonia at age of 5 years but no other

serious illness. There was no history of hemoptosis, cyanosis, loss of weight, or chronic cough. No history of malignancy in immediate family.

The first suggestion of the present trouble was the onset of snoring and difficulty in breathing through the nose at night. Seeing nothing abnormal either in the nares or oropharynx, I confess I was at first inclined to believe the patient was exaggerating his respiratory discomfort, and it was only because of his insistence that I decided to make digital examination of the postnasal area in order to satisfy myself that the adenoid tissue had been completely removed at operation five years before.

Much to my surprise, I could scarcely insert my finger above the level of the soft palate in the midline. A tumor mass, rather firm to the touch, was found to occupy practically the whole of the central area of the nasopharynx but did not extend into the lateral wall on either side. Because there was no marked encroachment on the Eustachian tubes doubtless accounts for the fact that there were no ear symptoms.

Patient was admitted to the ward on Aug. 23, 1932, for biopsy.

On Aug. 24, blood report showed: Hemoglobin, 95; R.B.C., 4,980,000; W.B.C., 8,600; C.I., 96. Wassermann negative. X-ray Report (Smith): "Left maxillary antrum seems to be clouded. Other sinuses are clear. Turbinates appear slightly enlarged. An area of increased density overlies the shadows of the nasopharynx. I cannot, however, recognize the shadows of the mass." Urine negative for albumin and sugar. Report on Biopsy (C. J. Bucher): "Specimen consists of three small pieces of tissue. They are irregular in outline. Two of the pieces are fairly hard, the third is rather soft. All are yellowish-white in color. On section they are translucent, yellowish-white, slightly granular and homogeneous. Formalin fixation.

"Histology: Section consists of tissue from tumor of nasopharynx. It is divided into alveoli by fibrous strands. These strands send off fine fibres which penetrate the alveolar spaces and support the tumor cells. The tumor cells are of moderate size, with a moderate cytoplasm and round, sometimes irregular, nuclei. Mixed with the tumor cells are a few red blood cells and a few leukocytes. The tumor is extremely vascular. The vessels in general are not large but rather small capil-

laries that pervade the tissue substance. There are areas of necrosis. In one area the tumor reaches to the epithelial margin and the surface epithelium is attached to the section. In other areas the tumor cells occur in small nests and cords. Here the cytoplasm is slightly more abundant and the nuclei are round and oval, even resembling epithelial cells. The growth is a malignant tumor, it is probably of mesoblastic origin, and therefore most likely a sarcoma; however, there is a possibility that the cells are lymphocytes and that this is a true lymphosarcoma. The important thing is that it is malignant and growing rapidly. Diagnosis: Round-cell sarcoma."

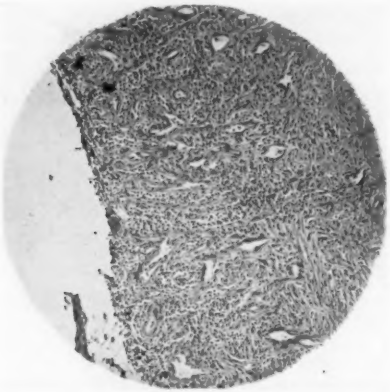

Fig. 1. Photomicrograph of round-cell sarcoma. Section shows rather marked vascularity of the tumor (mag. 100x).

Treatment: Because of the obvious difficulties encountered in surgical removal of tumors in the nasopharynx, the treatment of choice appears to be the use of X-ray and radium. This was the method employed in treating this patient. It was planned to give, first a series of deep therapy X-ray exposures, followed by a rest period of three or four weeks, after which radium would be applied.

From Sept. 2 to Sept. 30, 1932, patient received 10 treatments to right side of the neck for a total of 1,296 radium units, and 11 treatments to the left side of the neck for a total of 1,440 radium units.

Following these applications, there was no marked change in the size of general appearance of the tumor — perhaps a

slight diminution in size, which rendered nasal respiration a little more practicable.

On Oct. 1, 1932, the patient was readmitted to the ward for the application of radium. At this time his general physical condition remained about the same, still considerable obstruction to nasal respiration, and epistaxis occurred at intervals during the day.

Implantation of Radium: Four needles, each containing 12½ mg. of radium, were implanted in the growth and allowed to remain six hours — a total of 300 mg. hours. The patient

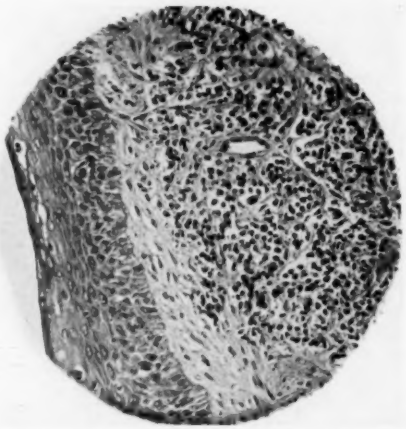

Fig. 2. Higher magnification (250x). Section shows epithelium of mucous membrane covering the tumor. The tumor cells are well defined.

was discharged on Nov. 2. He was kept under observation, however, until Nov. 21, when he was readmitted for further radium treatment. During the interval following first application, the patient had been attending school and engaging in all normal activities. The tumor was greatly reduced in size and nasal respiration was fairly free. On Nov. 22, one needle containing 12½ mg. of radium was implanted in the remaining small tumor mass. This was removed after six hours, or a total of 75 mg. hours. The patient was discharged from the hospital next day and was seen regularly in the Clinic during the succeeding weeks. Gradually, the postnasal wall became smooth and firm. Normal nasal respiration was resumed. The

patient has reported to the Clinic for examination regularly every three to six months during the past five and a half years. He is now 21 years of age, employed as a barber, and there has never been any sign of recurrence of the tumor either at the original site or in any other part of the body from metastasis.

I believe the satisfactory outcome in this case is largely due to the fact that the patient complained so insistently of his inability to breathe through the nose that the tumor was found at a comparatively early stage of its existence, and before it had reached the auditory mechanism, the cranial nerves, or cervical glands.

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AN UNUSUAL CASE OF LYMPHOEPITHELIOMA OF NASOPHARYNX. CASE REPORT.*†

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The patient was a white boy, age 11 years, who was transferred to the Babies Hospital from the Neurological Institute, where he had been under observation for about nine days. Patient gave a history of lethargy, apathy, sleeplessness, headache and personality changes extending over a period of two months. The changes in personality consisted of a disinclination towards any activity, a desire to "be left alone" and a loss of interest in his schoolmates and his usual games. There was a history of a head injury some time in the early fall and also a history that for some time there has been a "spot behind his ear which is extremely tender to touch." The mother was unable to state whether the symptoms of headache, apathy, etc., were present either before the accident or when the tender spot appeared behind the ear. Since the onset of these symptoms the boy has lost 10 pounds in body weight. While in the Neurological Institute he complained of sore throat, pain in his left ear and developed tender cervical lymph glands. X-rays of the skull were negative and those of the mastoids showed clouding of the left mastoid.

Past and Family History: Irrelevant.

Physical Examination: Temperature, pulse and respiration normal. Patient was a fairly well nourished and well developed white boy, age 11 years, who appeared chronically ill. There was decided fullness of the left cheek. He was unable to open his mouth widely and had tenderness and less movement of the left temporomandibular joint. The left side of his soft palate was pushed forward and fixed. The uvula was deviated to the right. The left side of the nasopharynx was filled with an irregular mass resembling adenoid tissue. The left tonsil was more prominent than the right. There was weakness of the left masseter muscle when patient closed his mouth, and the muscle did not respond to stimulation as

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quickly as its fellow. No nasal discharge or obstruction of the nose was noted. The left drum was retracted and injected superiorly. His hearing was moderately impaired, as tested with a watch. No tenderness was noted over the mastoid process; however, a small, tender lymph gland was noted at the tip of the left mastoid. The cervical glands were enlarged on both sides, those on the left being much larger and quite tender. The rest of the physical examination was essentially negative.

Laboratory Findings: Hemoglobin, 90 per cent; R.B.C., 5,240,000; W.B.C., 13,800; polymorphonuclear leukocytes, 70 per cent; lymphocytes, 21 per cent; monocytes, 9 per cent. *Urinalysis:* Color, straw cloudy; reaction, acid; specific gravity, 1.022; albumin, negative; sugar, negative; acetone, negative; microscopic: amorphous urates; rare leukocytes; 1-2 R.B.C. *Sedimentation Rate:* One-half hour, 17 mm.; one hour, 54 mm. *Mantoux:* Positive (1:1,000 dilution, old tuberculin used).

X-ray examination of the mastoids and skull as reported by Dr. John Caffey, of the Babies Hospital, New York: *Mastoids:* Roentgen findings indicate considerable bone resorption in the left mastoid but there is no evidence of exudate. *Skull:* Left temporal bone shows diffuse haziness, with loss of definition. This same lack of definition extends throughout the petrous pyramid.

It was felt that the symptoms and findings this patient presented were due to the mass in the nasopharynx. The fact that the growth was more on one side and with bilateral cervical adenitis, malignancy was suspected. The mass was removed for microscopic examination. On digital examination of the nasopharynx and visualization with a Yankauer speculum, a mass was found in the fossae of Rosenmüller on the left side of the nasopharynx, extending down into the oropharynx. The tissue was firmer, more fibrous and bled more freely than the adenoid tissue which was in the midline.

The gross and microscopic examination of the tissue removed at operation was examined by Dr. B. H. Paige, of the Babies Hospital, New York, and reported as follows: "*Gross:* The specimen consisted of 11 pieces of yellowish-gray to reddish tissue, measuring from 5 to 6 mm. to 2.6x1.4x 1 cm. in size. These are soft. The largest pieces on section

are homogeneous and translucent and white in color. *Microscopic:* The sections consist of lymphoid structures covered by stratified columnar epithelium and containing in portions numerous mucous glands. The normal lymphoid structures are widely replaced by sheets and masses of tumor cells, which are large, but with pale, indefinitely outlined cytoplasm. The nuclei are round or elongated in shape and vary in size. Mitotic figures occur in moderate number. In many regions tumor cells appear in sheets distinctly separated from the surrounding lymphoid tissue; in other regions, however, tumor cells in large numbers practically replace the lymphoid structures, and among them scattered lymphocytes and plasma cells appear. Eosinophiles are numerous in such regions. With Foot's stain, delicate reticulum fibres surround groups of tumor cells, but only rarerly do they penetrate between tumor cells." *Diagnosis:* Lymphoepithelioma of nasopharynx.

Treatment: The patient was treated by the Radiotherapy Department of Presbyterian Hospital. The tumor was crossfired through five fields; two lateral in the region of the angle of the mandible; two frontal through the maxillary portals; and one posterior. He received a total of 9,050 Roentgen units, which were given in daily or every other day doses over a period of two months. The formula used was 200 K.V., 25 M.A., 50 T.S.D., speed 35r/m. Filters of 1 mm. of copper and 1 mm. of aluminum were used.

Follow-up: After patient had received his full course of radiotherapy, no evidence of the mass in the nasopharnx could be found. The cervical lymph glands showed no enlargement or tenderness. Patient was entirely symptom-free and has remained so for a period of 21 months.

In presenting this case, I would like to review some of the symptoms that nasopharyngeal cancers produce. I have compiled the following symptoms from 79 cases of nasopharyngeal malignancies which New[1] reported in 1921; the symptoms of the 69 cases which Woltman[2] reported in 1922; and the nine cases of nasopharyngeal cancers with cranial nerve involvement which Hansel[3] reported in 1932.

Since most nasopharyngeal cancers are quite malignant and metastasize early, cervical adenitis is often the first symptom noticed. The cervical glands may be involved bilaterally,

even though the cancer is only on one side. Usually the first cervical glands to become involved are those below the angle of the mandible on the affected side. They are often tender and greatly enlarged.

The ear symptoms most often met with are fullness, tinnitus and deafness from obstruction of the Eustachian tube by the tumor mass. Other symptoms are otalgia and mastoid tenderness, which are usually due to secondary infection of the middle ear and mastoid. There may be pseudomastoid tenderness, as in this case, when there is involvement of the postauricular lymph glands.

Nasal and pharyngeal symptoms which might be entirely absent are obstruction and hemorrhage. Trismus is noted when there is involvemnt of the pterygoid muscle. In cases where there is invasion or enlargement of lymphatics and lymph glands in the region of the jugular foramen, paralysis of the soft palate and pharynx, due to involvement of the IXth nerve, may be produced, and where there is quite extensive involvement in this region, Jackson's syndrome may be found.

Occasionally, as in this case, there is involvement of the motor division of the Vth nerve, giving paralysis of the muscles of mastication. This symptom is often accompanied by the pain experienced in trifacial neuralgia, from involvement of the sensory division of the Vth nerve.

The eye symptoms that might be produced are diplopia, usually from involvement of the VIth nerve; blindness and proptosis by direct invasion of the tumor or by pressure; and ptosis from involvement of the IIIrd nerve.

Other symptoms, such as those referable to the intracranial disorders caused by direct invasion of the cranial cavity by the tumor, are headaches, etc. There are a few cases of facial paralysis reported where the tumor has involved the Fallopian canal.

This case is of interest to the otologist, in that the symptoms and signs of middle ear disease and mastoiditis were presented; however, on routine examination, a growth in the nasopharynx was found which looked like adenoid tissue, but

since it was more on one side than the other, malignancy was suspected and a biopsy was taken. The fact that this case was originally suspected as having mastoiditis stresses the importance in examination of the nasopharynx in cases presenting symptoms of middle ear disease and mastoiditis.

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THE TONSILS AND SINUSES IN RHEUMATOID ARTHRITIS.*

DR. ROBERT L. MCCOLLOM, New York.

This paper represents a preliminary study of rheumatoid arthritis cases being carried on in the Edward Daniels Faulkner Arthritis Clinic at the Columbia University-Presbyterian Hospital Medical Centre. The purpose is to try and evaluate the part that ear, nose and throat infections play in rheumatoid arthritis, particularly from the viewpoint of focal infection. Ear infections have apparently played little part in this study, so the main consideration seems to be concerned with the tonsils and sinuses. Dental infections have not been included in this particular study. The report is concerned with the 110 cases of rheumatoid arthritis, otherwise known as atrophic or chronic infectious arthritis, as seen in adults, including only two cases under 20 years of age.

In considering arthritis cases, whether it be in the doctor's office or the clinic, it is important to the ear, nose and throat man that he establish the diagnosis of the type of arthritis involved, as well as possible, before attempting to remove or eradicate possible foci of infection. If unable to establish the diagnosis himself, it would be well to have an arthritis specialist, if available, see the case before starting therapy. The reasons for this should be obvious as there are some types of arthritis that we are sure are not nose and throat problems. As an example, in the last year I have seen three cases of gonorrheal arthritis which had the tonsils removed in an attempt to clear up the arthritis, without waiting to establish the diagnosis of the arthritis involved. At the Arthritis Clinic at the Medical Centre we, fortunately, have numerous arthritis specialists available to establish the diagnosis for us. We have a nose and throat booth in the Arthritis Clinic itself so that the cases may be closely followed and discussed without getting lost by shunting back and forth from clinic to clinic, as is so frequently the case in large medical centres.

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DIFFERENTIAL DIAGNOSIS.

1. The rheumatoid group may be diagnosed by the history and physical findings, which include stiffness in the joints and migratory swellings with ankylosis and deformity in the latter stages, plus the X-ray, which is usually helpful. Further, the sedimentation rate is usually one of the best diagnostic aids. It is almost invariably high, varying from 15-20 mm. per hour to 110 mm. or more per hour. The streptococcus agglutination test is positive in from about 40 to 70 per cent of the cases. The antistreptolysin titre is usually low. This type of arthritis is thought by Dr. Dawson and Dr. Boots, at the Medical Centre, to be tied up with hemolytic streptococcus infection, and possibly caused by it.

2. The rheumatic fever group is quite closely akin to the first group and in the early stages the differential diagnosis is difficult. The two types are sometimes seen together. This group usually has heart changes and a high antistreptolysin titre, as well as a high sedimentation rate. These, together with history and physical examination, usually establish the diagnosis.

3. The hypertrophic or degenerative osteoarthritic group is usually seen in heavy, elderly people and is characterized by hypertrophic and degenerative changes in the bone and cartilage. The X-ray findings and low sedimentation rate are usually aids in the diagnosis. This group is not thought generally to respond to attempts to eradicate foci of infection.

4. The gonorrheal group is usually monarticular and diagnosed by the X-ray findings, history, physical examination and positive complement fixation tests.

5. There is another large group which are not true arthritis cases but which are often diagnosed as such. These are the fibrositis and myositis cases often associated with acute sinusitis, acute tonsillitis and gripped infections, with transient joint and muscle pains. While these are not true infectious arthritis cases, it is possible that some of these are a forerunner of future rheumatoid arthritis or rheumatic fever. This group as a whole usually respond well to corrective ear, nose and throat therapy and are often listed as arthritis cures.

6. There are numerous other more uncommon types of arthritis, such as those of syphilis tuberculosis, gout, etc., which I will not go into at this time.

In this group of 110 rheumatoid arthritis cases, studied and followed for the last three to five years, 81 were females and 29 were males, with an average age of 30 to 55 years. Fifty gave a history of upper respiratory infections. The average sedimentation rate was from 30 to 60, and most of them had typical histories of stiff and swollen joints with pain. A good many had joint deformities. Forty per cent of them had a positive streptococcus agglutination test. The antistreptolysin titre was low in most cases.

TONSILS.

In reviewing the status of the tonsils in this group, 70 cases have had tonsillectomy, and 40 cases have had no tonsil operation. Of the 70 cases with tonsillectomy, 24 had their tonsils removed from six months to 25 years prior to the onset of the arthritis. Six of these had secondary tonsils of consequence, four of which had been done with the diathermy or electrocautery. The remaining 46 cases had tonsillectomy done after the onset of the arthritis and have been followed, on the average, about five years. Thirty-three of these, or 72 per cent, showed no improvement in their arthritis or were worse. Seven cases showed slight to moderate improvement in a one-year follow-up. Two cases showed marked improvement. Four cases showed improvement for from three to eight years and then had a recurrence of arthritic activity. Thirteen cases in all, or 28 per cent, showed some improvement following tonsillectomy. Of the 40 cases not having tonsillectomy, 28 showed no improvement (or 70 per cent), and 12 cases showed from slight to marked improvement, representing 30 per cent. In other words, the percentage of improvement in the nonoperative group, although not as large, was almost the same as in the operative group.

Thirty of the 110 cases who gave a definite history of frequent sore throats or colds, including five cases of quinsy preoperatively, have had no colds or sore throats postoperatively. In other words, a fairly large group has had a definite reduction in the incidence of upper respiratory infections.

In culturing the throats of these cases, 29 were positive for hemolytic streptococcus, 15 with the tonsils in and 14 with them out. There were 50 cases negative for hemolytic streptococcus.

THE SINUSES.

In reviewing the sinus cases it was found that 69 out of the 110, or 62 per cent, had no definite sinusitis, either by history or physical findings, which included negative transillumination and negative sinus X-rays in practically all of the cases. Of these, 15 showed improvement, or 23 per cent.

There were 29 cases, or 26 per cent, which gave no definite history of sinusitis but had either one or both antrums dark by transillumination and with varying degrees of cloudiness by X-ray. These cases had no physical findings suggesting active sinusitis. They had repeated antral irrigations with a clear return and little appreciable change in the joint status following this procedure. One case prepared for a Caldwell-Luc operation was not completed as such, because the mucosa appeared normal on inspection at the time of operation. Of these cases, nine showed improvement, or 31 per cent.

There were 12 cases with either a previous history of purulent sinusitis or with a definite purulent sinusitis on examination. Of these cases, seven were cleared of their purulent sinusitis by from three to five antral irrigations. Two had permanent openings performed for a persistent purulent condition in one antrum, which cleared soon after operation. Two were cleared of their purulent sinusitis before the onset of the rheumatoid arthritis.

Six of the purulent sinus cases showed from slight to definite improvement in their arthritis following sinus treatment. This represents 50 per cent improvement in the purulent cases.

Three cases had a Lubi mucous resection and two had removal of nasal polyps. The arthritis was not appreciably changed in these five cases.

DISCUSSION.

In this group of cases, admittedly small, the results following tonsillectomy are disappointing. This may be due to the fact that over-emphasis has been placed on the part that the tonsils play as a focus of infection in rheumatoid arthritis. Or, perhaps, in this particular group of cases the arthritis has become so well established that it is too late to expect improvement following tonsillectomy. In private practice, one usually sees the cases earlier, before they may have fallen

into the category of typical rheumatoid arthritis, and perhaps this type of case will show better results from tonsillectomy.

As far as the sinuses are concerned, it was surprising to see the large number of cases with no history or findings to indicate the presence of sinusitis. Of those with definite sinusitis, the results were such as to lead one to continue every effort to clear up the infection. Here again, perhaps the long-standing infection with fairly severe joint lesions present in most of the cases gives poorer results than one would expect.

In conclusion, in rheumatoid arthritis in adults, in this series of cases the response to the attempt to eradicate possible focal infection is not marked. In a few selected cases there is some improvement and anything we can do to improve these cases is worth while. A plea is made to try and establish the diagnosis of the type of arthritis involved before proceeding too rapidly with attempts to eradicate foci and claiming cures from therapy.

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MULTIPLE MYELOMA INVOLVING THE TEMPORAL BONE.*†

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This case of multiple myeloma involving the temporal bone is reported to the otological profession because it presented at an early stage symptoms of otitis media and then of mastoiditis. The case had been seen and studied on the general medical and surgical wards of the Presbyterian Hospital, and a tentative diagnosis of multiple myeloma had already been made, so the mastoid operation was not performed. In another case, it is conceivable that the mastoid symptoms might be more pronounced and the generalized marrow disturbance be overlooked. In fact, even in this case, it was not until sections had been made of various organs of the body that the diagnosis of diffuse multiple myeloma was definitely established.

Only one case in which the diffuse type of multiple myeloma involved the temporal bone has been found in the literature. This was the case described by de Harven, Murdoch and Cahen.[1] In discussing the subject of multiple myeloma, one immediately comes upon the problem of nomenclature, for one finds that the disease runs over on one side to so-called plasmacytoma, or myeloma which may be relatively benign and localized, and, on the other hand, to plasma-cell leukemia which is relatively malignant and profuse. The cases described by Neumann,[3] Riser and Sorel,[4] Conestro[2] and Burch[6] are cases in which the myeloma was confined to the skull. At least, no mention was made in their reports of involvement of other parts of the skeleton, either by X-ray or by microscopic examination. Now, it is possible that these cases were also examples of generalized diffuse multiple myeloma, for a case of multiple myeloma was described recently by Jacobson,[5] in which no evidence of myeloma was discovered either by X-ray or by gross examination of the bones. The diffuse myelomatous involvement was only discovered by microscopic sec-

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tion. It is probable, however, that the cases described by the above authors are cases often diagnosed as "plasmacytomata" in this country. In none of these cases was there marked cachexia or evidence of generalized disease, such as found in true cases of diffuse multiple myeloma. Also, no Bence-Jones proteinemia was reported.

Case Report: S. E., male, age 61 years; history 470,205; autopsy, 12,062. Patient came to the Presbyterian Hospital with a history of gradual loss of weight and strength of five months' duration. Following a G.I. series on the outsde, he was admitted to surgery for resection of carcinoma of the stomach, but gastric series in the hospital failed to reveal any evidence of carcinoma. Careful work-up showed that he had Bence-Jones protein in his urine. X-rays of the skull and bones were normal except for small areas in the skull, which could be interpreted as the usual blood lakes found in the skulls of old people. There were also small areas of decreased density in the second lumbar vertebra.

Serum albumin, 4.1; globulin, 1.4; hemoglobin, 50; R.B.C., 2,000,000; W.B.C., 8,400; polys., 36; eosinophiles, 2; lymphocytes, 44; monocytes, 5; plasma cells, 18 per cent. Sedimentation Rate: 47; basal metabolism: —9; Wassermann: Negative.

Physical examination on first admission showed an emaciated, slightly disoriented old man. Eyes, ears, nose and throat normal. Teeth out. No general glandular enlargement. Lungs: coarse rales and whistles at both bases. Heart normal. Abdomen showed enlargement of left lobe of liver; bilateral indirect inguinal hernia. Rectal normal. Extremities normal except for weight loss. Reflexes equal and active. Audiogram showed moderate conduction deafness for the low notes and a nerve deafness for the high notes.

Course: During his stay in the hospital, patient received some benefit from transfusions. Sternal puncture was done, but this showed no evidence of multiple myeloma or abnormal cells. He was sent home, where he remained for one month, only to be readmitted with increased weakness and failing strength. Ten days before his second admission, he developed pain in the right ear, with spontaneous rupture of the drum and drainage of pus. Eight days before this admission, there

was pain in the left ear. Myringotomy was done, followed by a thin serous discharge. Both ears were draining on admission. Culture from ear showed hemolytic streptococcus and hemolytic staphylococcus. X-rays of the mastoid showed haziness of cells on both sides; of sinuses, showed marked clouding of the entire sinus system. Films of the skeleton showed no definite evidence of myeloma. The discharge from the ears became thicker and assumed a grayish character on the left. There was slight tenderenss of the left mastoid and sagging of the posterosuperior canal wall, but it was felt that the patient was entirely too ill from general disease to warrant subjecting him to mastoidectomy. He died seven weeks after

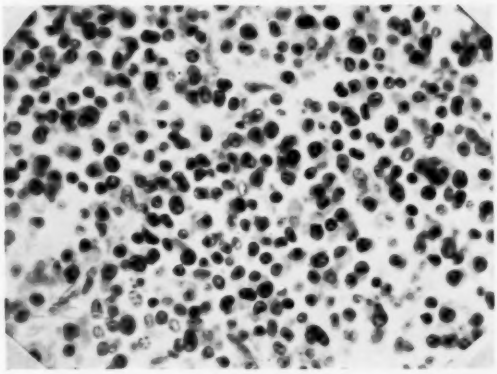

Fig. 1. High power showing the arrangement of the chromatin in the plasma-cell nuclei and the prominent nucleolus in many of these nuclei.

his second admission to the hospital. During this time, the otitis media continued, but seemed to become less and less severe. He was signed out by the clinicians as "neoplasm suspected, site undetermined, multiple myeloma?"

At autopsy, he was found to have multiple myeloma of the plasma-cell type, in the skull, vertebra and at the site of the sternal puncture in the sternum. Secondary myelomata were found in the liver, spleen, pancreas and lungs. There was a terminal lobar and lobular pneumonia; acute interstitial myocarditis; generalized arteriosclerosis and small adenomata of thyroid and pituitary. In addition, he had a nephrosis, thought to be due to Bence-Jones proteinuria. There was a large mass, the size of a golf ball, in the left middle fossa,

which grew from the lateral portion of the petrous ridge and caused indentation in the temporal lobe. On section, this was found to be a mass of plasma cells of more or less uniform size. The cells, however, did not all have the typical nuclear arrangement of plasma cells, for the nucleolus was quite prominent (see Fig. 1).

On making serial sections of the temporal bone, it was found that this mass grew from the inferior portion of the external auditory meatus and projected into the meatus (see Fig. 2). In addition to this mass, there were a few areas in the mastoid which contained myelomatous cells. There was no invasion of the middle ear by tumor growth. Both the

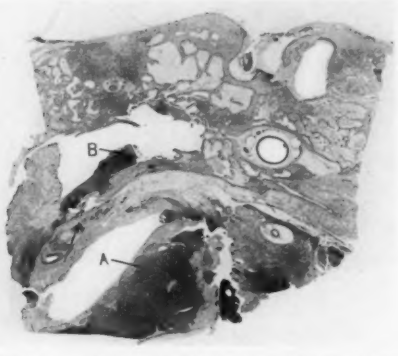

Fig. 2. Horizontal section through the vertical portion of the carotid artery showing tumor growth from the middle fossa (A), tumor growth in the external auditory meatus (B).

middle ears and some of the mastoid cells contained thickened mucoperiostra and were infiltrated with the usual polymorphonuclear neutrophiles and monocytes (plasma cells) found in otitic infections. There were several areas of plasma-cell infiltration in the marrow of the portion of the petrous pyramid, which lies medial and anterior to the arcuate eminence. There were fewer areas of this type on the right side than on the left (see Fig. 3). Microscopically, these areas in the marrow resembled those found in the parietal bones, the vertebra and the sternum; that is, there was considerable variation in the size of the plasma cells. Their growth was irregular and they were not so densely packed as in the tumor found in the middle fossa. The areas thought to be

blood lakes in the skull during life were also found to be myelomatous.

Some of the mastoid cells near involved marrow cavities showed invasion by tumor tissue. The invasion occurred in the submucosa and pushed the mucous membrane into the centre of the involved cell (see Fig. 4). The growth was definitely from marrow cavities through the occasional dehiscence found in the walls of mastoid cells. This type of growth emphasized the connection between the periosteal lining of mastoid cells and the nearby marrow. This was particularly interesting in lieu of Wittmaack's theory of pneumatization. Here we have, in fact, a reversal of the normal process of pneumatization. Instead of the mucous membrane pushing the marrow

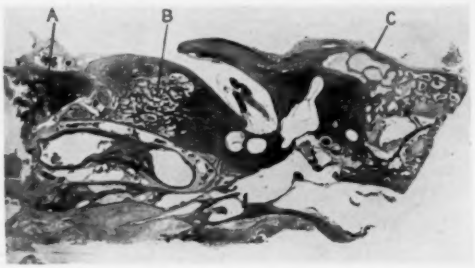

Fig. 3. Horizontal section through the region of the stapes on the right side showing myelomatous growth in petrous pyramid, dense most medially (A), and fading into normal marrow (B) near the cochlea. A small area of tumor tissue is found in the anterior wall of the middle fossa in the region of the mastoid (C).

out of the bony cavities, we have marrow tissue forcing its way along the natural openings in the trabeculae into the very areas from which it had been originally displaced.

Though the patient showed plasma cells in his blood and a Bence-Jones proteinemia, the diagnosis of multiple myeloma was very difficult to make during life, because of the fact that the patient showed no definite X-ray changes suggestive of disease. Tumor growth in certain areas in the marrow is usually extensive, and so pathologic fractures may occur (38 per cent in the series of Ghormley, et al.[7]). This patient showed no such thing. The small areas of decreased density in his skull and jaw so closely resembled those often found in the skull of old men that the radiologist did not feel justified in making the diagnosis of myeloma. (Comparison of the

plates showed that there was a slight increase in the size of the punched-out areas of the skull as time went on. This is much more compatible with a diagnosis of multiple myeloma than with a diagnosis of blood lakes in the diploe.) The large area of decreased density in the occipital portion (see Fig. 5) was also so indistinct that it was not diagnosed during life, but became more significant when a tumor was found in this area at autopsy.

The finding of plasma cells in the blood and of metastatic tumor growth in the liver is interesting, but not germane to our discussion of this case from the otological standpoint.

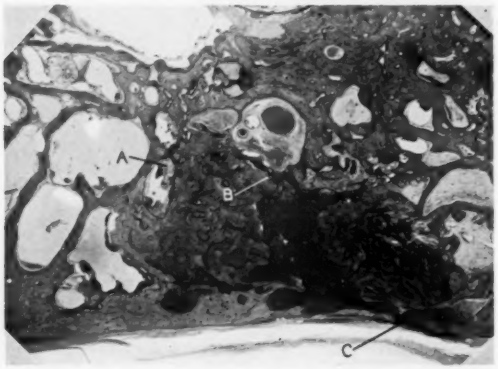

Fig. 4. High power in the region of the stapedius muscle showing infiltration of marrow into the submucosa of the mastoid cells (A), into the Fallopian canal (B), and through the cortex of the mastoid into the posterior fossa (C).

More interesting to us is the difference between the tumor which invades the external auditory meatus and medial cranial fossa, and the tumor growth within the marrow of the mastoid and petrous pyramid. It was suggested to me by Dr. M. Richter that the large free-growing tumor, which had quite uniform structure, was the primary tumor, and that the other, more atypical growth, were secondary. In general, multiple myelomata are in the form of multiple nodular tumor growths, no one of which can be considered as the primary tumor. In the particular form of multiple myeloma, in which the cells grow diffusely in the bone marrow, an isolated nodule which can be considered the primary tumor is rarely found and is generally not thought to exist. Our case belongs to this sec-

ond group, and Dr. Richter pointed out that the possible reason why a primary nodular growth is not found in the diffuse type of multiple myeloma may be because small primary growths in the sinuses and temporal bone can be overlooked, if serial sections are not available. Prof. Pappenheimer agrees that this is possible, but suggests that the more probable explanation for the uniformity of the growth of the external meatal growth in this case is due to the fact that the tumor is growing in soft tissue rather than in marrow, and that it is, therefore, more likely to have a uniform cell struc-

Fig. 5. X-ray of the skull in the cephalo-occiput position which shows area of decreased density on petrous ridge on left and small punched-out areas in calvarium.

ture. Against this view is the fact that liver growth is not uniform. However, both viewpoints are worthy of careful consideration and could be well defended.

Another point of interest to the otologist in this case is the fact that the marrow of the temporal bone is no more immune to marrow disease than any other marrow. Anyone studying a large number of temporal bones is aware of this, but it does not ordinarily occur to the otologist. For example, aplastic anemia, lymphatic leukemia, pernicious anemia and hyperplastic bone marrow due to sepsis, all occur in the

temporal bone, and, for that matter, in the ossicles. Of course, when one thinks about it there is no reason why this should not occur. After all, the bone marrow of the petrous portion of the temporal bone is no different from the bone marrow of other bones of the body, provided that it has not been replaced by air cells.

Infection of the mastoid was of the low-grade type, with considerable granulation tissue infiltrated with plasma cells; however, there was no similarity between this plasma-cell infiltration and the plasma-cell tumor growth of the marrow. The infection of the mastoid in this case was probably secondary to stasis produced by the tumor growth. The cloudiness of the mastoids in X-rays was undoubtedly due to edema of the cells, inflammatory exudate and granulation tissue, rather than the actual infiltration of the mastoid by tumor growth.

The case is presented as an unusual condition which can be encountered in otologic practice. Apparently, it must be particularly guarded against in cachetic old men, although one case in a child has been reported.

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CONTRIBUTION TO THE STUDY OF GRIPPE OTITIS, MYRINGITIS BULLOSA HEMORRHAGICA, AND ITS RELATIONSHIP TO LATENT SCURVY.

DR. SIMON L. RUSKIN, New York.

The form of otitis media associated with grippe is so characteristic as to be definitely diagnostic. In the literature it is usually described as myringitis bullosa hemorrhagica. Hemorrhagic vesicles appear on the skin of the inner third of the external auditory canal, spreading over to the drum membrane and forming sharply demarcated purplish blebs. At times similar dark colored blebs are seen in the tympanic cavity shining through the drum membrane. These hemorrhagic vesicles seem to come in crops and, while the larger ones rupture with a discharge of blood and slight amount of serum, new ones appear to form. In the early stage there are few or no constitutional signs. There may be but slight or no elevation of temperature, yet the pain and discomfort is severe and the appearance of the ear that of acute inflammation. It is little wonder then that the first impulse of the otologist has been to incise the ear. The subsequent course is usually attended with elevation in temperature, followed by middle ear discharge, with eventual healing or progression to mastoid involvement. The spontaneous course is likewise attended frequently with rupture of the vesicles in the middle ear, the accumulation of fluid in the middle ear and spontaneous rupture of the drum membrane followed by the typical discharging middle ear and its possible complications.

Nasal examination of these patients as a rule does not show suppurative involvement of the nose or accessory sinuses. The mucosa is congested and shows occasional bloody crusts. The elevation of temperature usually follows the rupture of some of the hemorrhagic blebs in the canal wall or tympanic membrane, marking the invasion of secondary infection, which usually is of the hemolytic streptococcus variety. One cannot help observing the fact that these hemorrhagic extravasations form an ideal media for growth of these organisms and probably account for their predominance.

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This picture assumes a unique significance when viewed in the light of Hess' classical description of infantile scurvy. In the "Pathogenesis of Infantile Scurvy," Hess states, "One of the most striking clinical phenomena of infantile scurvy is the marked susceptibility to infection which it entails—the frequent attacks of "grippe," the widespread occurrence of nasal diphtheria, the furunculosis of the skin, the danger of pneumonia in advanced cases. Whether this is to be in part attributed to the disturbance in water metabolism, in view of the fact that a similar susceptibility exists in malnutrition cases where the tissues likewise contain an excess of water, there is no basis for judging, but the clinical fact is striking and significant." He goes on to state that "Scurvy sometimes occurs in epidemic form. A few years ago we had an opportunity of observing an epidemic of infantile scurvy in connection with an outbreak of 'grippe' at the infant asylum. We do not suggest that as a distinct type of the disease, for, as we have just said, infection is common as a secondary state of scurvy." Hess relates an epidemic in one ward affecting 12 children who developed symptoms of various infections; otitis, pneumonia, nephritis, adenitis, etc. Three died of pneumonia; of the nine who recovered, seven suffered from what he terms infectious scurvy, meaning by this a type of the disorder brought about by superimposing a secondary infection in the primary nutritional disturbance. Some of the infants showed signs of alimentary intoxication; most of them had no fever at the time the hemorrhages occurred, although they may have had a rise of temperature when the infection began. In April a second epidemic of "grippe" took place and three more infants developed scurvy. The signs were mainly hemorrhagic, developing at sites both typical and atypical for scurvy. "It was striking that many of the hemorrhagic signs were quite different from those encountered in infantile scurvy. We have never met with such widespread subcutaneous hemorrhages and have noted them in the literature only in the most advanced cases." He concluded that latent scurvy was prematurely changed to florid scurvy by the presence of a ward infection; an epidemic of grippe precipitated an epidemic of scurvy exceptional in its hemorrhagic tendency. Hess also points out that these cases stand out from ordinary scurvy, not so much in their exceptional symptomatology as their lack of response

to specific therapy in the diet. It is interesting to note his explanation. He states, "The diet is at fault in allowing the intestinal bacteria to elaborate toxins. It is doubtful whether the toxin is always the same and, therefore, whether from a strictly etiologic standpoint the disorder should be regarded as an entity. Infantile scurvy is an intestinal intoxication due to overgrowth of harmful bacteria in the intestine. It is the product of an unbalanced flora which is no longer controlled by a proper dietary."

With our present knowledge of the structure of cevitamic acid and its oxidation reduction properties, one can readily see that intestinal toxins would react with it and deprive the body of the normal vitamin C absorption. Hess' *Observations of 1917* are confirmed today by P. Marin (Scurvy Due to Destruction of vitamin C by Intestinal Bacteria, *Minerva Medica*, Turin, p. 25, July 14, 1936). Marin's patient, age 22 years, showed a picture of acute rheumatism, dyspepsia, intense anemia and general debility, high fever and intense hemorrhagic gingivitis. A diagnosis of scurvy was made but in spite of dietary antiscorbutics, showed no improvement until parenteral therapy was instituted. He attributed the destruction of the vitamin C in the diet to B. Coli and B. parathyroid.

In view of this keen observation of Hess, it is all the more significant to note Goethlin statistics on the prevalence of the prescorbutic state. He showed that 22 per cent of the school children in parts of Scandinavia showed signs of latent scurvy.

We must consider whether gastrointestinal disturbance lays the groundwork for the ensuing grippe and otitis by the creation of the prescorbutic state.

Reverting to our consideration of the ear, we find that one of the most delicate areas of skin in the body is that of the inner third of the external auditory canal. Even slight pressure in this area with a cotton tipped applicator elicits either a small hematoma or free bleeding. There is here almost no subcutaneous tissue and an extravasation of blood manifests itself directly as a hematoma or blood vesicle. If one were to select an index for hemorrhagic extravasation, the ear canal and middle ear could be used for standard. It is to be expected

then that when the combination of grippe and latent scurvy occurred, associated with the hemorrhagic manifestations, that the picture of myringitis bullosa hemorrhagica should be a frequent occurrence.

The association of this condition with latent scurvy pointed directly to the application of vitamin C therapy with striking effect.

In the period of one year, ten cases of myringitis bullosa hemorrhagica were observed. All received large doses of vitamin C in the form of calcium cevitamate. Only a few of the cases received paracentesis and all showed signs of improvement within 12 hours and had resolved within four to five days. There was a marked lessening of pain after the first day and those cases showing a thin serous discharge from the middle ear received no medication to the ear and no irrigations. The cotton in the ear canal was changed whenever moist.

The results were too striking to permit of question as to the therapeutic effect of the parenteral administration of the calcium salt of vitamin C. The association of grippe and latent scurvy by Hess receives added confirmation through the addition of myringitis bullosa hemorrhagica to the syndrome.

Case 1: Mrs. Rose C., age 34 years, appeared Jan. 10, 1937, complaining since early morning of severe pain in the right ear, radiating to right lower jaw. Did not have any nasal discharge. Has had no fever. Examination of the right ear revealed two hemorrhagic vesicles on the canal wall and one large purplish bulla covering the posterior superior quadrant. The remainder of the drum was congested and drum details obliterated. The patient received 3 cc. of a 15 per cent solution of calcium cevitamate intramuscularly. The next day the patient was seen at home. She was fairly comfortable. One of the canal vesicles had ruptured, discharging some blood. She received another injection of 3 cc. of 15 per cent solution of calcium cevitamate. The next day she was quite comfortable and there was no further bleeding or discharge. Three days later the vesicles had disappeared and resolution was complete.

Case 2: Joseph W., age 4½ years. On April 30, 1937, there was a history of a grippe cold, with temperature 102° that morning. Since previous afternoon had been complaining of pain in the right ear. Examination of the right ear showed a right acute otitis media with hemorrhagic vesicles on canal wall and drum. The tympanic membrane was incised. Simultaneously an injection of 3 cc. of 15 per cent solution of calcium cevitamate was given intramuscularly. Dry treatment followed. The next day the patient was comfortable. There was a slight serous discharge which had disappeared by the fourth day, the drum details were reappearing, and he was free from symptoms referable to the ear. He received a second injection of 3 cc. of 15 per cent solution of calcium cevitamate.

Case 3: Milton K., age 17 years, appeared Feb. 25, 1937, complaining of pain in the left ear for last 24 hours. Had grippe cold for a few days without much nasal symptoms. Examination revealed typical hemorrhagic bullae on the canal wall and drum. He received 3 cc. of calcium cevitamate 15 per cent, intramuscularly. He received another injection on the following day. On the third day there was reappearance of the drum details followed by rapid resolution. No paracentesis was performed.

Case 4: Frank K., age 10 years, referred by Dr. Kohlenberg on March 6, 1937. The child had been suffering from a grippe cold for about two weeks. On the preceding day developed pain in the right ear, followed that night by a fever of 102°. Examination of the ears showed a myringitis bullosa hemorrhagica on the right side. He received 3 cc. of 15 per cent solution of calcium cevitamate intramuscularly. No paracentesis was performed. The child's improvement was so great that the parents did not think further care necessary.

Case 5: Abbott L., age 17 years, appeared on Dec. 8, 1936, with a history of pain in the left ear since the preceding night. He had no previous cold, no headache, no nausea. Examination of the ears showed typical left myringitis bullosa hemorrhagica. He received one injection of 3 cc. of calcium cevitamate intramuscularly. The next day the vesicles showed evidence of drying and recession of the myringitis.

Case 6: Marcia B., age 11 years. The child had a relatively mild grippe followed by pain in the right ear for two days. The pediatrician on the case felt that a paracentesis was indicated. The tympanic membrane was swollen, inflamed and moderately full posteriorly. The drum details were obliterated. There were no hemorrhagic manifestations, although the canal wall appeared quite inflamed. Injection of 3 cc. of 15 per cent solution of calcium cevitamate intramuscularly was followed that night by relief from pain and evidence of resolution the next day. The change in the general appearance of the patient and the local condition of the ear was striking.

Case 7: Joel D., age 3 years, on April 26, 1937, gave a history of a cold for three-four days, followed by pain in the left ear. He had no fever. Examination of the ears showed a left myringitis bullosa hemorrhagica involving canal and tympanic membrane. He received 3 cc. of 15 per cent calcium cevitamate intramuscularly. The next day there was definite evidence of improvement with resolution appearing on the third day.

Case 8: Bernice G., age 11 years, on Jan. 4, 1936, appeared complaining of pain and impairment of hearing in left ear. She had had an attack of grippe for about one week. Examination revealed myringitis bullosa. She recieved one injection of 3 cc. 15 per cent solution of calcium cevitamate. The next day the ear appeared much improved and resolution followed in the next two days.

Case 9: Louis H., Jr., age 2 years, 2 months, was seen Oct. 6, 1937, on the second day after onset of a cold. The child had a temperature of 101° and apparently was having pain in the left ear. Examination revealed nasal congestion with slight discharge. The left ear showed the external auditory canal swollen and inflamed, with a ruptured vesicle filling the canal. When this was wiped away the typical picture of hemorrhagic bullosa was visible. Paracentesis was performed and serosanguineous fluid evacuated. The child received 1½ cc. of 15 per cent solution of calcium cevitamate simultaneously. The ear was kept dry with change of cotton in canal. The next day the ear was practically dry and in two days definite resolution was visible.

Case 10: Miss Hanna E., age 42 years, referred by Dr. L. Miller was seen March 22, 1936, complaining of a head

cold, nasal discharge and cough for one week. Two days previously she had pain in the right ear, followed by spontaneous rupture the next morning. At the time of the examination she had severe pain in the ear and mastoid tenderness. A suppurative otitis media was diagnosed. A paracentesis was performed to improve drainage. She received no injection of calcium cevitamate. She was sent home under care of her physician. The customary irrigations with H_2O_2 and water was advised. The ear drained for three weeks and then resolved. On Oct. 29, 1937, she appeared again with a hemorrhagic myringitis bullosa, spontaneous rupture of the drum and serosanguineous discharge. She received three daily injections of 3 cc. of 15 per cent solution of calcium cevitamate. Resolution was almost complete on the fifth day. Three weeks later the ear was inflated a few times to improve a sense of stuffiness from the Eustachian tube.

Although one could say that acute otitis media simplex with rapid resolutions is a common experience, yet these cases were definitely not of that type and would usually run a course of ten days to three or four weeks. In this series the calcium salt of vitamin C has been employed because of the enhanced vitamin C action of the calcium salt, its ready solubility and non-irritating character.

Vitamin C excretion tests for the determination of the prescorbutic state were not performed because of their impracticality in office cases. The urine has to be titrated three times a day as it is excreted and the examination made within a few hours at most, if not immediately. The therapeutic dose employed, particularly in children, 450 mg., is sufficiently large to saturate the body needs and would not be a good indicator of the requirements.

SUMMARY.

1. The relationship of myringitis bullosa hemorrhagica to latent scurvy is pointed out.

2. The work of the late Alfred Hess and his correlation of grippe to latent scurvy is emphasized.

3. The value of parenteral administration of vitamin C as the calcium salt in the treatment of grippe otitis is demonstrated.

4. A criterion for the differentiation of otitis is presented and a new etiologic factor described.

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351 West 86th Street.

SALIVARY FISTULA FOLLOWING MASTOID OPERATION. TWO CURED CASES.*†

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Salivary fistula following mastoidectomy is a sufficiently rare occurrence to attract attention when seen. It is rarely considered in a discussion of the complications of mastoidectomy. To date, about 30 cases have been reported in the literature. The two cases reported this evening are the only ones ever seen at the Presbyterian Hospital in New York. Moreover, they were both cured by operation.

An excellent presentation of this subject was delivered by Babbitt at the Sixty-fourth Annual Meeting of the American Otological Society, in 1931, with report of a case. The discussion of this paper was quite interesting, in that various otologists recited their experiences with different methods of treatment of this condition and varying degrees of success. I shall briefly review the theories of etiology of postmastoidectomy fistula:

First, the parotid gland extends unduly upward and backward and superficially, so as to be caught in the usual mastoid incision. Second, the mastoid incision is too long, extends below the tip and damages the parotid gland. Third, a congenital anomaly involving a branchial cleft or cyst is present, causing mucous fistula.

The diagnosis of this condition is simple, providing it is thought of. Failure to diagnose properly has resulted in mastoid surgery, with failure to close the wound. Following a mastoidectomy, although the upper part of the wound heals, a small sinus remains in the lower angle, which exudes a watery secretion indefinitely. The fluid increases after meals or tart foods. There may be swelling of the area, increased after meals. The patient must, therefore, wipe his neck during or after each meal — a perfect nuisance.

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†From the Otolaryngological Department of the Columbia Presbyterian Hospital, Medical Centre, Dr. John D. Kernan, Director.

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The absence of purulent discharge and the relation to meals constitute the diagnostic points. Probing the sinus is usually unsatisfactory, as it is small and tortuous. Injection is difficult, though it may sometimes demonstrate a direct connection to the mouth, when methylene blue or iodide is used.

Various methods of treatment have been suggested for salivary fistula. Silver nitrate, chromic acid, plastic closure and the actual cautery have been tried, with different results. Several cases have been closed by X-ray treatment. Hochfilzer, in 1933, cured one case by electrocoagulation. The close proximity of the facial nerve must be constantly remembered in any procedure in this region as it lies just under the fistula. I will now summarize the records of the two cases which form the basis of this study.

Case 234,689: R. K., female, age 11 years, was admitted to the Vanderbilt Clinic on Dec. 30, 1929, complaining of persistent drainage from a left mastoidectomy wound. The past history was irrelevant, except for a double mastoidectomy performed at the hospital, eight months prior to admission. Examination showed the following: The nares were negative. The nasopharynx showed some adenoid tissue and mucopus. The oropharynx was negative. The right mastoidectomy scar was well healed; the right ear was dry. The left ear canal contained some thick mucoid discharge. At the extreme lower end of the left mastoid scar was a watery discharge, which increased on talking or eating. This fluid was found to be alkaline to litmus paper. X-rays of the mastoids, following injection of lipiodol into the sinus, showed an opaque shadow in the soft tissues below the mastoid; but no opaque substance was seen in the parotid region. On Jan. 20, 1930, I injected methylene blue into the sinus, but it did not appear in the mouth.

A diagnosis of parotid fistula was made. The patient was admitted to the Presbyterian Hospital and operation was performed by Dr. Harry Neivert on Aug. 8, 1930. A probe could not be introduced into the fistula at operation. An incision was made through the fistula down to gland tissue. Some gland tissue was removed and the wound closed without drainage. Postoperative convalescence was smooth and rapid. The wound healed completely. It has never discharged since.

Dry treatment with boric acid and iodine powder and silver nitrate was used in the middle ear, which was dry after Nov. 21, 1930. When seen in 1937, the wound was healed and the canal was dry.

The pathological report showed dense fibrous tissue, with a few islands of parotid salivary tissue and fat. The gland tissue was normal, with no evidence of malignancy.

The above experience was quite satisfactory. From this time on, a close watch was kept for other cases but none was seen until June 8, 1937, when Case 2 was admitted to the Vanderbilt Clinic. This was L.B., Case 520,278, a boy, age 2 years, whose chief complaint was running ears and discharge behind the right ear. The history follows: At the age of 1 month, the child was operated upon at the hospital for pyloric stenosis, following which he developed acute bilateral mastoiditis, which required double mastoidectomy. This necessitated treatments for about a year. At the age of 1 year, both mastoids were again operated upon at another hospital, following which all drainage ceased, except for seepage of clear fluid from a small fistula behind the right ear after drinking.

The child was admitted to Babies Hospital on June 14, 1937. Examination showed dry canals. The left mastoid wound was completely healed. The right mastoid scar showed a pinpoint fistula at the lower end, with watery discharge at the surface.

Upon drinking water, a large amount of fluid appeared. It was noted that the mastoid incision extended quite low. The tonsils were enlarged and there was some adenoid. A diagnosis of parotid fistula was made.

Operation was performed on June 17, 1937, under ether anesthesia. I first injected methylene blue into the fistula. The dye was seen in the mouth at once. An incision was made through the center of the fistula above and below the pinpoint. The fistula was found to extend inward for a quarter-inch. It then spread out into numerous ramifications, resembling ducts in gland tissue. The entire fistulous area was removed down to the gland, a section of which was removed, until a smooth surface was obtained. The subcutaneous tissues were closed with interrupted catgut sutures, the skin with interrupted dermal.

Microscopic sections from the tissue removed showed several lobules of gland tissue, the largest of which could be identified as parotid gland. The postoperative course was smooth. The sutures were removed in six days. At first, there was a little swelling over the wound, but healing was complete on July 12. On Nov. 24, 1937, the child developed a recurrent mastoiditis on the same side, which required incision of the postauricular scar; however, the fistula did not open up.

Summary: Two cases of parotid fistula following mastoid operation were diagnosed by the appearance of clear salivary fluid at the lower end of the mastoid scar. Both were successfully healed by excision of the fistulous tract, which contained parotid gland tissue.

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OSSIFICATION IN THE AURICLE. SEVEN CASES.

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Although Scherrer[1] found reported up to 1932 only 40 cases of ossification in the auricle, from which he concluded that the condition was of rare occurrence, it is probable that Fraenkel,[2] who was able to report 15 personal cases, was correct in his belief that bony deposits in the auricle are not so rare. I previously[3] have observed eight of these interesting cases and include here reports of seven more. References to cases, other than those listed in Scherrer's publication, are included in the bibliography[4] and this brings the total to 61 cases.

Ossification in the external ear is easily overlooked, for usually there is nothing in the appearance of the affected ear to indicate its presence, and in most instances it is discovered only by palpation. The physician is rarely consulted for this condition, because the bony deposits do not cause symptoms unless they are so thick that when the patient is reclining there is pain in the ear from pressure of it against the side of the head.

Ossification in the auricle is usually observed in males past 50 years, but may occur at any age and in either sex. There may be no history of preceding aural infection, frost-bite or injury, but often the patient recalls that one of these occurred years previous. A preceding frost-bite of the ear probably is the most common etiologic factor and this, with the degenerative changes in the cartilage, which may occur in old age as a result of impaired circulation and nutrition, seems more apt to bring about ossification. Senile keratoses may occur in the skin of such ears. Other possible causes[1] of bony deposits in the ear are endocrine disturbances, syphilitic perichondritis, inherent properties of ossification of cartilage and general debilitating diseases. The regions of the ear in the order of frequency with which they are affected are the helix, scaphoid fossa, the antihelix and the concha. The ossified areas vary considerably in size, there may be a deposit of bone 1 or 2 mm. in diameter, and less often the

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whole ear, except the skin and lobule, becomes bony, in which case the ear may be fixed to the canal and practically immobile. Both ears may be affected.

The diagnosis may be made by palpation, but should be confirmed by Roentgenograms because the auricular cartilage if thickened and hard may seem bony to palpation and yet contain no calcified areas. If ossification is present there is a marked increase in density of the portion affected, for these are true bony deposits.[1] Rarely is treatment necessary even if the bone is much thickened.

Case 1: J. P. M., a robust appearing white man, age 64 years, came in July 12, 1937, because of a discharging left ear. The hearing on this side had been impaired for many years. Both ears had been frost-bitten many years before.

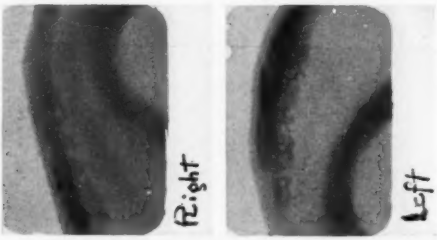

Fig. 1. Roentgenograms of the ears of Case 1, showing ossification in the helix of both.

Arising in the left middle ear was a large polyp which almost filled the canal. The helix of both ears was of bony hardness. There was a bilateral conduction type of deafness with a 10.6 per cent loss of speech in the right ear and 34.6 per cent loss in the left. Roentgenograms of the mastoids showed both to be sclerotic, the result of an old chronic infection. Roentgenograms of the auricles revealed ossification in each (see Fig. 1). The nose was deformed and obstructed as a result of a previous fracture. The aural polyp was removed and local treatment was instituted for the chronic otitis media, which then subsided rapidly. The patient had never been conscious of the calcification in the auricles and no treatment was prescribed.

Case 2: D. McM., a white man, age 64 years, was examined July 28, 1937, because his right ear felt "stopped up." For the previous 12 years there had been ringing in the ears

each time he had a cold. The hearing had been impaired for several months. Both ears had been frost-bitten many times, years before in Nova Scotia, Maine, and in the Dakotas. Cerumen was removed from the right ear canal with immediate improvement in the hearing. The drums appeared normal. The lower helix of the right ear and the upper helix of the left on palpation were found to be of bony hardness. A bilateral early nerve deafness was diagnosed by aid of tuning forks and the audiometer. There was mild atrophy of the nasal mucosa. The examination otherwise disclosed nothing remarkable. Roentgenograms of the ears showed ossifi-

Fig. 2. Roentgenograms of the ears of Case 2, showing ossification in helix of left ear and in the lower scaphoid fossa of right ear.

cation in both (see Fig. 2), but this ossification had never caused symptoms.

Case 3: J. S., a white man, aged 61 years, was examined Sept. 21, 1937, because of deafness in the left ear. This was first noticed two years previous and lasted one and a half years, but cleared up immediately after a fall in which the head was struck. The deafness had recurred two weeks before his examination. The patient gave a history of rheumatism years before, but no infection, freezing or injury to the ears. Impacted cerumen was removed from both ear canals with marked improvement in the hearing. With the audiometer

and the tuning forks there was found a loss of hearing for speech of 5.2 per cent in the right ear and 9.2 per cent in the left. The cartilage of both ears was thickened and that in the helix of the right felt bony. A deviation of the nasal septum produced much obstruction on the right side. The tonsils apparently were infected. Roentgenograms showed

Fig. 3. Roentgenogram of the right ear of Case 3, showing small bony deposit in helix.

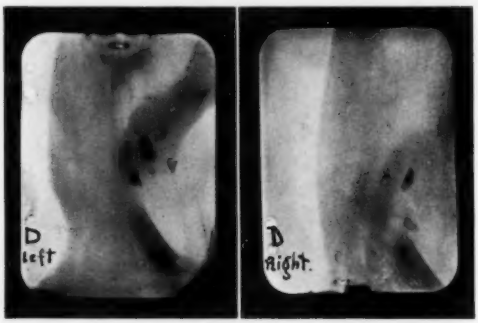

Fig. 4. Roentgenogram of the ears of Case 4. There are three tiny pieces of bone in the concha of the right ear and five or six in the concha of the left.

bone in the helix of the right ear (see Fig. 3). The patient had never been conscious of this.

Case 4: L. S., a Chinese, age 47 years, was examined April 14, 1937, because the lobe and concha of the left auricle were uncomfortable in warm weather. This ear had been troublesome for five or six years. Two years previously this ear had been treated by another physician because of redness

and swelling of the lobe, injections of varisol being made into the lobe on several occasions. The ears had never been frost-bitten or injured, and the right ear had never been uncomfortable. In 1931, this patient had been treated for trachoma. The ear drums were retracted and the conchas of both ears were of bony hardness. The lobules appeared normal. The tonsils appeared diseased. Vision was 10/15 in the right eye, 5/50 in the left. On this eye there was a marked symblepharon which extended from the external and internal canthus and lower lid to the lower half of the cornea, which was scarred. A biopsy of this tissue was negative for malignancy. The Verne reaction was negative. Roentgenograms of the ears showed several small bony deposits in the concha of both (see Fig. 4).

Fig. 5. Roentgenogram of the left ear of Case 5, showing ossification in the helix.

Case 5: E. A., a white male, age 69 years, came in Sept. 23, 1937, complaining of deafness which had been increasing for 15 years. His blood pressure was elevated and two months earlier he had had an apoplectic stroke. He had worked as a sailor many years before, but did not recall that the ears had ever been infected, frost-bitten or injured. A bilateral nerve type of deafness was diagnosed with the aid of tuning forks. The concha of both ears on palpation was found to be of bony hardness. Roentgenograms of the ears showed ossification in the helix of both, and this process was more extensive in the right ear, but the Roentgenograms of only the left was saved (see Fig. 5).

The patient had never been conscious of anything unusual about the auricles. The blood pressure reading was 210 systolic, 128 diastolic. The Wassermann reaction was negative.

The ophthalmologist diagnosed mixed astigmatism and presbyopia. The examination disclosed nothing further.

Case 6: S. S. L., a white male, age 49 years, was examined Oct. 8, 1937, because of a buzzing sound in the right ear, which was worse in the evening, and which had been noticed for two years. The hearing was impaired, there being an early nerve type of deafness. Portions of the antihelix

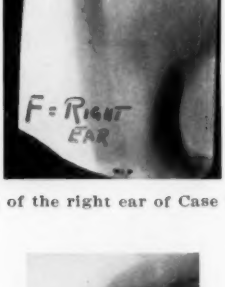

Fig. 6. Roentgenogram of the right ear of Case 6, showing ossification in the helix.

Fig. 7. Roentgenogram of the left ear of Case 7, showing ossification in the helix.

and concha of both ears on palpation were quite hard. Roentgenograms of each were negative, except for a tiny deposit of bone in the helix of the right ear (see Fig. 6). There was no history of previous frost-bite or infection of the ear. The nose was irregular and its interior partially obstructed as

a result of a previous injury to it. The tonsils had been removed. Ophthalmological examination revealed only a bilateral hyperopia and presbyopia.

Case 7: H. E. B., a white male, age 73 years, was examined Oct. 25, 1937, because of deafness, noticed for 30 years. This was worse with cold. Many years before the ears had been frost-bitten several times. Impacted cerumen was removed from both ear canals with some improvement in the hearing. However, with the audiometer and tuning forks he was found to have an advanced nerve type of deafness, the hearing loss for speech being 53.2 per cent on both sides. On palpation the helix of the left ear was very hard, and the Roentgenograms showed the presence of bone (see Fig. 7). The bony bridge of the nose was thicker than normal; there was a small keratosis in the skin over the nose; there were two scars on the left cheek, sites of a previous removal of other senile keratoses, and the tonsils appeared to be infected.

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Green's Eye Hospital.

CHONDROMA OF THE LUNG, REPORT OF TWO CASES.*†

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Two cases of chondroma of the lung are here reported. Though chondroma of the lung is no longer considered exceedingly rare, these cases are of especial interest since they were diagnosed bronchoscopically and the tumors were removed through the bronchoscope.

In a review of the literature since 1926 there have been very few cases so treated. Dr. Chevalier Jackson and Dr. Chevalier L. Jackson[1, 2] reported a case of chondroma of the bronchus removed by bronchoscopy in 1932. They also removed a chondrosarcoma in this way but this was considered a malignant tumor and, therefore, does not enter into the sphere of this paper. In a personal communication I learned that the Jacksons, of Philadelphia, have had four other cases of "cartilaginous tumors of the bronchial tree" but reports of these cases were not available. It is, therefore, impossible to say whether these cartilaginous tumors were benign or malignant, and whether or not they were totally removed through the bronchoscope.

There are in the literature a number of cases of chondroma of the lung which were discovered at autopsy as incidental findings. These gave no symptoms during life. For this reason the tumors at first were considered of slight clinical importance; however, later other cases were reported that did give symptoms and were successfully and unsuccessfully operated upon. Still later, some of the cases were diagnosed Roentgenologically and studies from this standpoint were discussed at length. These tumors were rather large, giving distinct shadows and encroaching upon the parenchyma of the lung. The tumors, however, as in our cases, are sometimes small enough not to be recognized Roentgenologically but cause obstruction of the bronchus, giving symptoms and find-

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†From the Service of Dr. John D. Kernan at the Lenox Hill Hospital, New York.

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ings secondary to the obstruction. Interest in the tumor, then, was shown at first by the pathologist, later by the internist and Roentgenologist who began to recognize them and realized that they may cause symptoms. Here we come across another means of diagnosis and treatment; that is, bronchoscopy.

Ewing[3] states, "In the lung, rare tumors occur as multilobed growths of hyaline cartilage, subpleural or deep within the lobe, and their association with connective and fat tissue points to an origin for some of them from a complex mass of tissue." Nevertheless, we encountered as many as 74 cases in the literature besides the Jackson cases. Hickey and Simpson,[4] in 1926, gathered 38 cases and added two of their own. Verga,[5] in 1932, reported three more cases and mentioned those of Hammer,[6] Durand and Launey,[7] Matras, Scaglia, Bayer,[8] Paul and Vanzetti. That made 61 cases, including those of Hickey and Simpson. Benninghoven and Peirce[9] reported two cases; Klages,[10] Sherwood and Sherwood[11] Chiodin and Picera,[12] Livingston,[13] Moore,[14] Peters[15] and Goldsworthy[16] each reported one case. Jaeger[17] reported four cases. All together, then, we were able to find 74 cases.

There is a great difference of opinion as to the origin of these tumors. Since so many of them were found distant to the bronchi, that is, in the lung parenchyma, and in the pleura, they were considered to have no connection with the cartilage of the bronchi and because of their complexity were called teratomas. Others felt that the tumors were hyperplastic growths from the bronchi as a result of chronic inflammation. It has also been said that these tumors have their origin in aberrant bronchial anlagen since all of the structures which go to make up these mixed tumors are normal components of the bronchi. The latter explanation seems most reasonable.

CASE REPORTS.

A. C., white, Italian male, age 59 years, admitted to the outpatient department of the Lenox Hill Hospital, complaining of a dry cough and expectoration for 15 years. No history of hemoptysis. Sputum not foul. No loss of weight. These symptoms were more marked for two years.

On examination, there was retraction of his left chest, dullness and absent breath sounds throughout. No rales. His right chest was displaced to the left. The impression given

was an intrabronchial benign neoplasm. The X-ray report at this time was as follows: "Heart and mediastinal contents are crowded over into the left side of thorax. Left side of diaphragm is indistinguishable, but from the position of gas bubble, one would suspect considerable elevation. There is

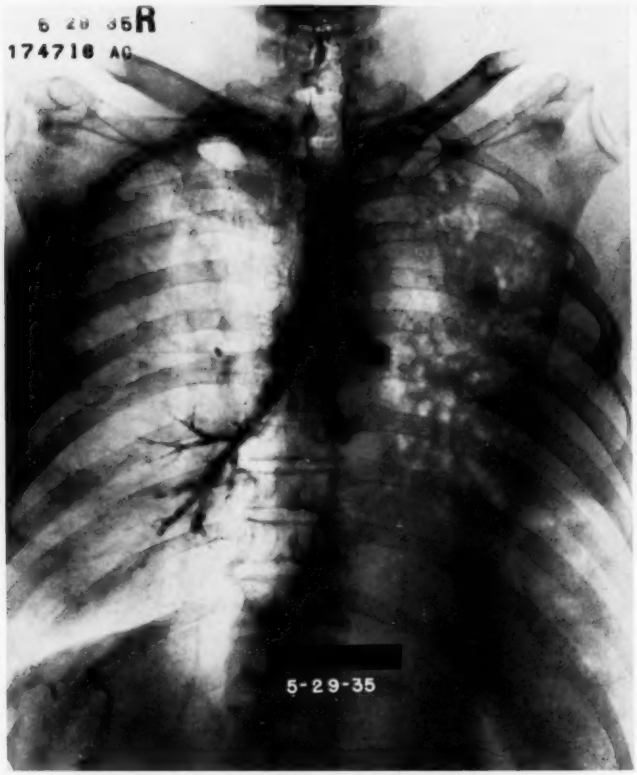

Fig. 1.

opacity in the left lower to a degree which blocks the outline of the heart and diaphragm. In the left upper, there is a mottled density almost as great. Right lung is clear throughout and hyperareated. *Impression:* Tumor of bronchus."

A bronchogram was done at this time. The report was as follows (see Fig. 1): "A bronchogram outlines the trachea

and right main bronchus. The bronchi on the right side are outlined in a normal manner. On the left side, the left main bronchus is outlined for about an inch from the bifurcation. There is a sharp cut-off and apparently complete obstruction of the bronchus at this point. The cutoff is jaggedly transverse. The entire left lung is spotty, apparently due to holes like in Swiss cheese, this probably representing multiple small cavities of a chronic fibrous pneumonitis with bronchiectasis. The trachea is pulled over to the left to a slight degree and the right side of the diaphragm is markedly elevated."

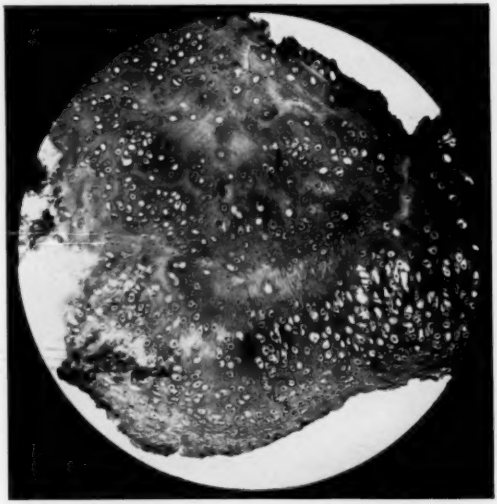

Fig. 2.

The patient was admitted to Dr. Thorburn's Service at Lenox Hill Hospital for further observation and study. A bronchoscopy revealed a definite tumor completely obstructing the left main bronchus, about an inch below the bifurcation. It was smooth-walled, not ulcerated, and nonvascular. The tumor so completely filled the bronchus that it was difficult to make out its point of attachment. An attempt was made to pull it away but this was unsuccessful. Some pus was seen coming from below it, though a suction tube could not be passed by it. A biopsy was taken. *Impression:* Probably a benign tumor of the bronchus.

The biopsy showed chronic inflammatory tissue.

Bronchoscopy was done again by Dr. John Kernan, who removed part of the tumor with a snare and forceps. He said at this time that the attachment was long and broad, at least

Fig. 3.

half the circumference of the bronchus. It appeared to be on the inner and posterior wall. Pus was coming from behind it. The tumor when examined macroscopically was firm and lobular and about the size of an olive.

Microscopic Report (see Fig. 2): "Microscopic examination of the specimen shows numerous fragments of atypical carti-

lage, many of the cells of which are degenerated. The cells vary in size, some being large and possessing prominent nuclei, while others contain smaller irregular nuclei. A large number of lime salt deposits are observed. Other fragments show bronchial mucous membrane, the surface of which is covered with pseudostratified columnar epithelium. The underlying connective tissue is extremely edematous and irregularly infiltrated with inflammatory cells, chiefly small round cells and plasma cells." *Diagnosis:* Chondroma of the bronchus.

About four months later, another bronchoscopy was performed and most of the remaining tumor was removed by snare. The report again showed the specimen to be a chondroma. Subsequently, small portions of the tumor were seen and removed with forceps until finally, after about four months, the site of the tumor was smoothly healed over, though a little protruding area was visible and there was no secretion in the lung. After the tumor was removed, coughing and expectoration increased for a while. The breath sounds seemed to come through better. The symptoms, however improved gradually. A bronchogram, a year after the removal of the tumor, was reported as follows (see Fig. 3):

"Examination of the chest following injection of lipiodol on the left side shows extensive saccular bronchiectatic involvement at the base of the upper lobe. The left main bronchus is outlined with lipiodol and while there is slight narrowing in close relationship to the bifurcation, the lumen appears to be almost normally patent."

Case 2: P. M., age 45 years, male, white. Admitted to Dr. Thorburn's Service at the Lenox Hill Hospital complaining of cough and expectoration for two weeks; pain in the left side of chest for two weeks and loss of 10 pounds in weight, one month. He had been working until two weeks before admission when he had pain in the left upper chest and occasionaly beneath the sternum. The pain increased on coughing and deep breathing. He had a nonproductive cough for 20 years. Occasionally, he would have greenish-yellow sputum, which was not foul. He had moderate dypsnea on exertion for the past two weeks and thought he had some fever.

Examination of his chest revealed on the left side markedly impaired expansion, dullness along the nipple line anteriorly and posteriorly below thoracic seven and also in the lower axillary line. Here there were bronchovesicular breath sounds

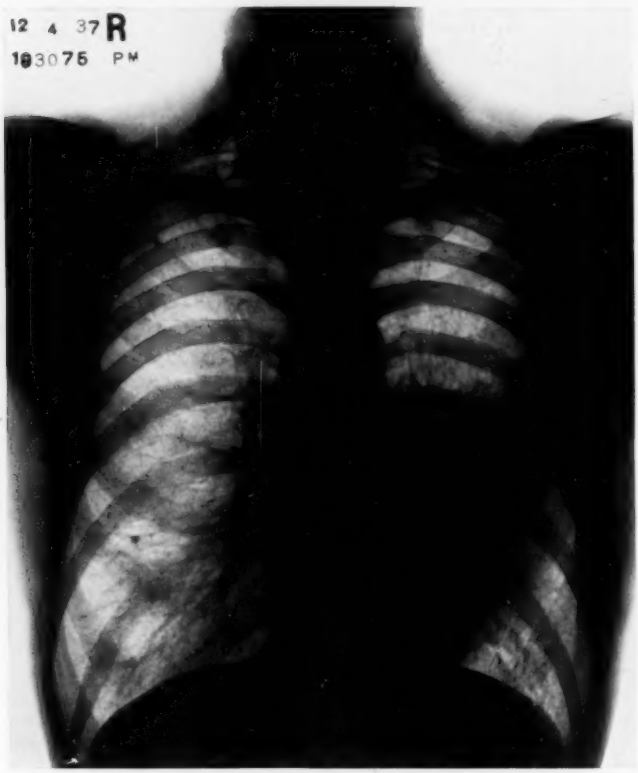

Fig. 4.

and also fine and coarse rales. The right lung was negative. X-ray report was as follows (see Fig. 4):

"Thorax is slightly asymetrical. Some narrowing of the interspaces on the left side. There is a shadow of increased density radiating outward and downward from the left hilum, which probably represents consolidation of the lung paren-

chyma, possibly associated with some atelectasis. The remainder of the lung parenchyma is fairly clear, although the hilum and bronchial shadows are accentuated throughout."

A bronchoscopy was performed. The findings were as follows: A bronchoscope was passed into the left main bronchus. The lower lobe was found to be negative. In the left upper lobe there was a mass which could only be seen by placing the tube directly into the lumen of the upper lobe bronchus. A biopsy was attempted and in so doing an elongated curved

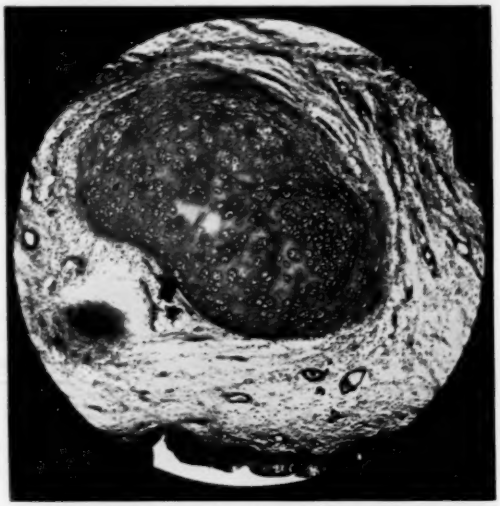

Fig. 5.

mass on a pedicle about 1¼ inches in length was removed. The tumor was firm and lobulated, consisting of cartilaginous masses with vascular connective tissue. The bronchus then appeared wide open. Very little bleeding and relatively little secretion were found beyond the tumor.

Microscopical examination of the specimen was as follows (see Fig. 5): "Decalcified sections through the pedicle show it to contain a large island of cartilage, the cells of which vary in size, some being large and possessing prominent nuclei, while others are smaller with very irregular nuclei. Some of them show degenerative changes, occasionally asso-

ciated with lime salt impregnations. The surface is covered with pseudostratified columnar epithelium, beneath which are several islands of mixed glands, supported by edematous connective tissue, which is rather diffusely infiltrated with plasma cells. Some of the glands are greatly dilated. Decalcified sections through the main portion of the mass show the surface to be covered with stratified columnar epithelium. The underlying tissue is diffusely infiltrated with plasma cells and large islands of cartilage are observed, portions of which are degenerated and contain lime salt deposits; other areas have undergone calcification. Section through the tip shows a small island of cartilage."

X-ray shortly after the removal of the tumor was reported as follows: "Partial resolution of the shadow of increased density previously reported. The area of inflammation is small and less homogeneous than at preceding examination."

The patient was examined bronchoscopically again and the lumen of the left upper lobe was found to be patent as far as one could see. Not enough time has elapsed to know whether the lung will clear entirely.

We have, then, two cases of chondroma of the bronchus, both giving signs and symptoms and X-ray findings of bronchial obstruction. Both cases were examined bronchoscopically and a tumor found to be completely obstructing the bronchus. The tumor in each case was totally removed through the bronchoscope, with immediate relief of obstruction and improvement in the symptoms caused by it. As far as we can determine, such cases have rarely been reported, and such cases again emphasize the importance of bronchoscopy.

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103 East 78th Street.

TWO IMPROVED INSTRUMENTS FOR USE IN PLASTIC SURGERY OF THE NOSE.

DR. CHARLES FIRESTONE, Seattle.

1. The Retractor-Speculum: This instrument is a modification of the Aufricht speculum. This modification is difficult to describe adequately in writing or in sketching, inasmuch as a photograph or sketch does not produce adequate pictorial presentation of the three dimensional planes which give it its merits. The rasp to be described below lends itself better to pictorial presentation, and the reader of this will probably get a better idea of the construction principles of the retractor-speculum from viewing the graphic presentation of the rasp (see below) than he will from the illustration of the speculum-retractor itself.

This retractor-speculum differs from the Aufricht speculum in that it is constructed with lateral angulation, giving it a three plane dimension basis of construction. The Aufricht speculum is constructed on a single plane basis. The *raison d'etre* of this instrument arose when during the course of nasal plastic procedures it was found that a speculum constructed on a single plane basis tends to tear and dislodge structures, as well as to find its way to the other side of the nose at the distal tip of the instrument. The speculum having its utility on the dorsum nasi, and the *modus intrandi* being on the inside of the nose, which is on a perpendicular plane to the dorsum, the need for lateral angulation of the retractor-speculum seems apparent. This instrument yields better visibility of the operative field, inasmuch as the assistant

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doing the retracting holds the handle to one side, right or left, depending on whether the operator is right or left handed. Pressure on the nasal tip is eliminated, inasmuch as the instrument does not come in contact with it.

2. The Nasal Rasp: The *raison d'etre* of the rasp for the dorsum nasi also had its inception during plastic procedures, inasmuch as the approach to the dorsum is from one side of the nose, which is in a plane perpendicular to the dorsum. Straight to and fro motion is physically impossible with an unangulated rasp, as the tip of the nose is bound to get in the way, and direct at least part of this motion diagonally to the other side of the nose. The extreme concave portion of the rasping surface cannot be definitely placed in the mid-

dle of the dorsum nasi as long as there is the slightest tendency of the rasp to move diagonally to the other side of the nose. In order to yield the desired convexity of the dorsum midline, the rasp must have free guidance and not be cramped to the other side by contiguous structures. It is the experience of this author that better cosmetic results are obtained with this rasp. There is a better view of the operative field, inasmuch as the handle is on one side, and the raspings can be better directed out of the operative field.

These instruments are manufactured by Storz Instrument Co., St. Louis, whose advertisement appears on page 7 of this issue.

1433 Medical-Dental Building.

THE NEW YORK ACADEMY OF MEDICINE

SECTION OF OTO-LARYNGOLOGY.

Meeting of Feb. 16, 1938.

Bacterial Otitic Meningitis. A Case Report. By Dr. Edw. R. Roberts.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

Primary Carcinoma of External Auditory Canal. Review of Literature and Report of Case. By Dr. Otto C. Risch and Dr. James R. Lisa.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

The Role that Surgery of the Paranasal Sinuses Plays in the Asthmatic Child. By Dr. Raymond C. Creasy.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

Surgical Indications in Sinusitis. By Dr. Daniel S. Cunning.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

Demonstration in Colored Motion Pictures of the Technique of Sinus Operation. By Dr. Lee Hurd, New York.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. DUNCAN MACPHERSON: Dr. Buckley spoke about the men who preceded him stealing his thunder. To a certain extent, Dr. Buckley has stolen my thunder; however, it is perfectly legitimate. I shall, therefore, have to change some of the points I was going to make and approach the subject from a different standpoint. As the gentleman read their papers, I noted one or two things in which they all agreed: The main thing was drainage. Dr. Creasy spoke of drainage as a help in asthmatic cases. By the way, Dr. Creasy has had the opportunity of seeing a large number of cases. Sixty cases of asthma, in childhood, is a great number to see in so short a period. He has been associated with a childlren's asthma clinic and was able to operate on this large number of cases and draw some deductions, which a good many of us have not had the opportunity of doing. He operated for relief of asthma by promoting drainage. Dr. Cunning spoke about the lack of drainage as an indication for surgery. Dr. Buckley speaks of drainage to relieve the complications for surgery. The proposition which we must all bring out is when to do it, where to do it, and how to do it. These problems will largely be decided by the individual surgeon at the time of the operation. Dr. Buckley has given a very fine demonstration here tonight, but it was very difficult to cover the entire ground suggested by his subject. I envy Dr. Cunning for having been able to cover so much ground in such a comprehensive way, and Dr. Buckley for the way he was able to cover so many complications in a very short time in his demonstration.

If we take the examples of cellulitis of the orbit and retrobulbar neuritis, which have been referred to tonight, we find there are mainly three types when due primarily to sinus complications: One of which you approach by

means of internal manipulations, such as suction and contraction, giving drainage without cutting operation; another which you can approach by what the late Dr. White, of Boston, referred to, and which was also mentioned by Dr. Buckley, as ventilation; and third, by means of external operation. Which of these you do depends on the judgment of the individual surgeon. There are a great many of these cases, especially in children, which will clear up with hot packs, suction and so on; another type will not clear up that way and you will perhaps have to ventilalte, and on still other cases you will have to do an external operation. That is also true in orbital cellulitis. I have never seen very good results follow operations through the upper eyelid. I have seen and done a great many cases by going through the nose externally taking down the orbital plate and draining the orbit down through the ethmoids into the nose with very good results. It is said that a 24 hour block in a sinus may or is likely to lead to pus, so that even in rhinitis it is important to provide drainage.

There is another complication which has not been referred to tonight. I suppose, therefore, I should not discuss it, but there are neck complications which are very important. Lymphatics leading from the nose, mouth, ear and upper pharynx drain down into a common lymphatic system. They drain first into the glands at the angle of the jaw. The second place where they are apt to show is the supraclavicular region, spreading down along the sheaths of the blood vessels. If you have a staphylococcus infection—a slow grade infection—you are apt to get some indication of that spread downward toward the supraclavicular region along the sheaths of the vessels; however, very frequently the first indication of an upper respiratory or external ear infection will be in the supraclavicular region, as an infection which is due to the streptococcus may manifest itself first in the supraclavicular region without giving any indication of its presence higher up. Here there is a serous exudate rather than pus formation which shows no conglomeration of the glands at the angle of the jaw. Those cases are dangerous because they first show themselves in the supraclavicular region and are liable to cause mediastinal involvement. There is danger in waiting too long and they should be opened earlier. It is important in all cases to find the original source of the infection. If you can find and eliminate the original foci early, when glandular involvement is slight, in the first week, very frequently the glands will subside. A good many of the retropharyngeal phlegmons originate in that way and I think these, like the retropharyngeal abscesses, are much more commonly the result of infections of this kind than due to tuberculosis with necrosis, as the textbooks state.

Regarding sphenoid conditions, I very commonly investigate a sphenoid for diagnostic purposes by the Watson Williams method. It is very useful I have done it in many cases and have had no complications from it. As a rule it is not difficult to do.

I enjoyed Dr. Hurd's demonstration very much. It looks very simple on the cadaver to get such a good opening under the inferior turbinate and it looks as though one could get in and remove a good deal of infected mucous membrane. It is so simple to go in under the lip through the canine fossa and be sure of a good opening and visibility, it seems as though one could resort to that method quite frequently where this other method is employed.

Dr. Sheer asked me whether I was going to say anything about short wave therapy. That has not been mentioned tonight, but because he mentioned it, I want to say that in the clinic in which I worked we turned one of our men, Dr. Laszlo, on to that problem for a long time. Dr. Laszlo, who is a careful worker, reported at the end of a year that his results were unconvincing. He had nothing commendatory to report.

I am just about through, but would like to make one more point. You will all realize from what has been said tonight the importance of knowing anatomy and of being able to recognize all the structures connected with the operation which you carry on. Every man who is a member of this Section should be qualified to do any of these operations, but he cannot qualify unless he has facilities for dead room work. In the city of New York we do not have such facilities.

AMERICAN LARYNGOLOGICAL ASSOCIATION.

The Sixtieth Annual Congress of the American Laryngological Association was held at the Marlborough-Blenheim, Atlantic City, N. J., on May 2, 3 and 4, 1938, under the presidency of Dr. John F. Barnhill. The program was carried out as planned and all scheduled papers were read. Mr. Victor E. Negus, Corresponding Fellow, of London, England, and Dr. Robert L. Goodale, of Boston, Mass., were guest speakers. Mr. Gavin Livingstone and Mr. Geoffrey Bateman, of London, England, were also guests of the meeting. The number in attendance was 129.

It is with deep regret that the Secretary announces the following deaths: Dr. Dunbar Roy, Atlanta, Ga., Active Fellow, July 5, 1937; Dr. Lorenzo B. Lockard, Denver, Colo., Active Fellow, July 31, 1937; Dr. John W. Farlow, Boston, Mass., Emeritus Fellow, Sept. 23, 1937; Dr. J. Price Brown, Toronto, Ont., Emeritus Fellow, April 3, 1937.

Dr. Henry Hall Forbes, of New York, and Dr. Elmer L. Kenyon, of Chicago, were elected to Emeritus Fellowship; Dr. Vilray P. Blair, of St. Louis, to Corresponding Fellowship, and the following to Active Fellowship: Dr. Charles D. Blassingame, 414 P. & S. building, Memphis, Tenn.; Dr. George E. Hourn, University Club building, St. Louis, Mo.; Dr. Chevalier L. Jackson, 3701 N. Broad street, Philadelphia, Pa.; Dr. Samuel Salinger, 25 E. Wasnington street, Chicago, Ill.; Dr. Harris H. Vail, 802 Carew Tower, Cincinnati, Ohio.

Upon recommendation of the Council, the Association conferred Honorary Fellowship upon Dr. D. Bryson Delavan at the final business meeting, May 3.

The membership of the Association now stands as follows: Honorary Fellows, 4; Corresponding Fellows, 20; Emeritus Fellows, 16; Active Fellows, 99.

The following officers were elected: President, Dr. George B. Wood; 1st Vice-president, Dr. Ralph A. Fenton; 2nd Vice-president, Dr. Frederick T. Hill; Secretary, Dr. James A. Babbitt; Treasurer, Dr. Chas. J. Imperatori; Librarian and Historian, Dr. Geo. M. Coates; 1st Councillor, Dr. John D. Kernan; 2nd Councillor, Dr. Burt R. Shurly; 3rd Councillor, Dr. Wm. B. Chamberlin; 4th Councillor, Dr. John F. Barnhill.

The Secretary announced that there would be no award from the Casselberry Fund this year.